2016 Energy Standards Residential Lighting

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Goals of this Course

- To understand what “luminaire efficacy” means, whether high or low
- To understand what requirements apply to lighting inside and outside of residential dwellings
- To understand what types of controls are required, and what they do
- And maybe to enjoy yourself

Questions?

- If you have a question, ask away!
- Interruptions are welcome
- Really... They're welcome
- My questions for you…

Section 1 (of 6)

Let’s begin with an introduction to the Energy Standards…

A Little CEC History

- Section 25402 of the Public Resources Code (known as the **Warren Alquist Act**)
- The act created the Energy Commission in 1974 and gave it authority to develop and maintain Building Energy Efficiency Standards
- Requires the Energy Commission to update the Standards periodically (about every 3 years)
- Requires the Standards to be cost effective over the economic life of the structure

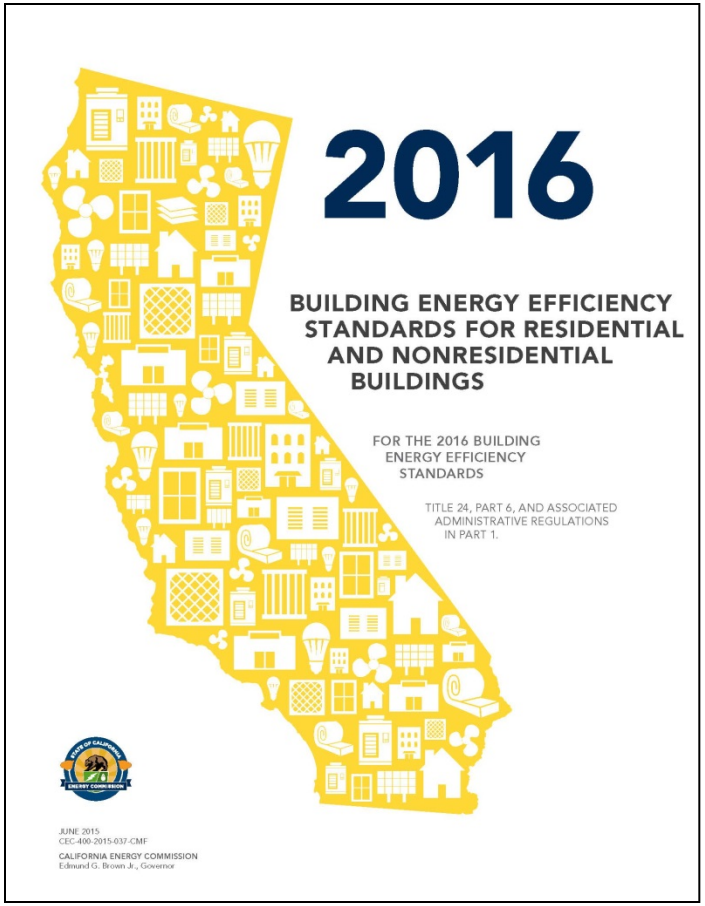
What the Future Holds

- AB 32 – Reduces GHGs and carbon footprint
- SB 350 – Doubles energy savings from efficiency and increases renewable energy to 50%
- CPUC/CEC Strategic Plan:
  - ZNE goal for residential buildings by 2020
  - ZNE goal for nonresidential buildings by 2030

Energy Standards will "evolve/expand" and become more stringent to reach these goals

2016 Building Energy Efficiency Standards

- **Effective on Jan. 1, 2017**
  - Building permit applications submitted on or after this date
- **Master plans for tract homes affected:**
  - Need to resubmit if permits pulled on/after effective date



Section 2

General and Light Source Requirements

Lighting Schedule

(§10-103)

Space Information				Existing Fixture			Retrofit Description		
Ref No	Floor	Room Number	Room Description	Fixture Code	Fixture Type	QTY	Retrofit Description	QTY	Notes from Auditor, Etc.
1	1	110	Office	A	2x2 lensed troffer with 2 F17T8s, .88 BF S ballast & specular reflector	6	2F17TBXL with GE Ultrastart program start ballast	6	
2	1	100A	Entrance/Hallway	A	2x2 lensed troffer with 2 F17T8s, .88 BF S ballast & specular reflector	2	2F17TBXL with GE Ultrastart program start ballast	2	Office currently vacant
3	1	100B	Waiting Area	A	2x2 lensed troffer with 2 F17T8s, .88 BF S ballast & specular reflector	6	2F17TBXL with GE Ultrastart program start ballast	6	Reception area, may not want occupancy sensors if a way to turn off lights during off hours.
4	1	100C	Private office	A	2x2 lensed troffer with 2 F17T8s, .88 BF S ballast & specular reflector	2	2F17TBXL with GE Ultrastart program start ballast	2	
5	1	100D	Open office	A	2x2 lensed troffer with 2 F17T8s, .88 BF S ballast & specular reflector	13	2F17TBXL with GE Ultrastart program start ballast	13	
6	1	100E	Storage	V	2x2 troffer or surface mount with 2 FB34T12 lamps	2	2F17TBXL with GE Ultrastart program start ballast & 2-cove white reflector	2	Both fixtures have U-bulbs. (only U-bulbs in building)
7	1	105A	Open office	A	2x2 lensed troffer with 2 F17T8s, .88 BF S ballast & specular reflector	18	2F17TBXL with GE Ultrastart program start ballast	18	
8	1	105B	Private office	A	2x2 lensed troffer with 2 F17T8s, .88 BF S ballast & specular reflector	3	2F17TBXL with GE Ultrastart program start ballast	3	
9	1	105C	Private office	A	2x2 lensed troffer with 2 F17T8s, .88 BF S ballast & specular reflector	2	2F17TBXL with GE Ultrastart program start ballast	2	
10	1	120A	Storage	A	2x2 lensed troffer with 2 F17T8s, .88 BF S ballast & specular reflector	1	2F17TBXL with GE Ultrastart program start ballast	1	
11	1	120B	Open Office with high partitions	A	2x2 lensed troffer with 2 F17T8s, .88 BF S ballast & specular reflector	13	2F17TBXL with GE Ultrastart program start ballast	13	
12	1	130A	Private office	A	2x2 lensed troffer with 2 F17T8s, .88 BF S ballast & specular reflector	3	2F17TBXL with GE Ultrastart program start ballast	3	
13	1	130B	Private office	A	2x2 lensed troffer with 2 F17T8s, .88 BF S ballast & specular reflector	3	2F17TBXL with GE Ultrastart program start ballast	3	
14	1	130C	Private office	A	2x2 lensed troffer with 2 F17T8s, .88 BF S ballast & specular reflector	2	2F17TBXL with GE Ultrastart program start ballast	2	
15	1	130D	Open office and reception area	A	2x2 lensed troffer with 2 F17T8s, .88 BF S ballast & specular reflector	33	2F17TBXL with GE Ultrastart program start ballast	33	Reception area, may not want occupancy sensors, unless some way to turn lights off during off hours.
16	1	130E	Conference Room	A	2x2 lensed troffer with 2 F17T8s, .88 BF S ballast & specular reflector	6	2F17TBXL with GE Ultrastart program start ballast	6	
17	1	130F	Hallway	A	2x2 lensed troffer with 2 F17T8s, .88 BF S ballast & specular reflector	3	2F17TBXL with GE Ultrastart program start ballast	3	
18	1	130G	Open office	A	2x2 lensed troffer with 2 F17T8s, .88 BF S ballast & specular reflector	30	2F17TBXL with GE Ultrastart program start ballast	33	
19	1	130H	Storage	A	2x2 lensed troffer with 2 F17T8s, .88 BF S ballast & specular reflector	6	2F17TBXL with GE Ultrastart program start ballast	6	
20	1	130I	Fire Storage	A	2x2 lensed troffer with 2 F17T8s, .88 BF S ballast & specular reflector	6	2F17TBXL with GE Ultrastart program start ballast	6	
21	1	130J	Storage	A	2x2 lensed troffer with 2 F17T8s, .88 BF S ballast & specular reflector	4	2F17TBXL with GE Ultrastart program start ballast	4	
22	1	141	Lunch/Waiting Area with tables	ASM	2x2 lensed surface mount with 2 F17T8s, .88 BF SB ballast & specular reflector	11	2F17TBXL with GE Ultrastart program start ballast	11	Area has no room number, arbitrarily assigned
23	1	142	Hallway	K	3 corridor wrap with 2 F25T8s & white lens	5	1F17TBC, custom centering kit & clear prismatic lens	5	Area has no room number, arbitrarily assigned, hallway has occupancy sensor
24	1	143	Break Room	H	4' wrap around with 2 F32T8s	1	1F32TBC & centering kit	1	Area has no room number, arbitrarily assigned, room has local manual switch
25	1	143	Break Room	HB	8' wrap around with 4 F32T8s	2	2F32TBC & centering kits	2	Area has no room number, arbitrarily assigned, room has local manual switch
26	1	144	Restroom	E	1x4 troffer with 2 F32T8s	2	1F32TBC & 1- cove white reflector	2	Area has no room number, arbitrarily assigned, restroom has occupancy sensor
27	1	145	Storage	J	4' wrap around with 3 F32T8s	2	2F32TBS in center lamp holders	2	Area has no room number, arbitrarily assigned, room has local manual switch
28	1	146A	Mail Room	J	4' wrap around with 3 F32T8s	2	2F32TBS in center lamp holders	2	Area has no room number, arbitrarily assigned, room has local manual switch
29	1	146A	Mail Room	JB	8' wrap around with 6 F32T8s	1	4F32TBS in center lamp holders	1	Area has no room number, arbitrarily assigned, room has local manual switch
30	1	146B	Storage	JB	8' wrap around with 6 F32T8s	2	4F32TBS in center lamp holders	2	Area has no room number, arbitrarily assigned, room has local manual switch
31	1	146C	Private office	J	4' wrap around with 3 F32T8s	2	2F32TBS in center lamp holders	2	Area has no room number, arbitrarily assigned, room has local manual switch
32	1	147A	Office/Workshop	GB	8' hooded industrial with 4 F32T8s	2	2F32TBC in alternating sides	2	Area has no room number, arbitrarily assigned, room has local manual switch
33	1	147A	Office/Workshop	GBTG	8' hooded industrial with 4 F32T8s & tube guards	2	2F32TBC in alternating sides & tube guards	2	Area has no room number, arbitrarily assigned, room has local manual switch
34	1	147A	Office/Workshop	R	4' strip fixture with 1 F32T8	1	1F32TBL	1	Area has no room number, arbitrarily assigned, light rarely turned on
35	1	148A	Storage/Old Cafeteria	ASM	2x2 lensed surface mount with 2 F17T8s, .88 BF SB ballast & specular reflector	8	2F17TBXL with GE Ultrastart program start ballast	8	Area has no room number, arbitrarily assigned, room has local manual switch
36	1	148A	Storage/Old Cafeteria	J	4' wrap around with 3 F32T8s	3	2F32TBS in center lamp holders	3	Area has no room number, arbitrarily assigned, room has local manual switch
37	1	148B	Open Storage	GBTG	8' hooded industrial with 4 F32T8s & tube guards	3	2F32TBC in alternating sides & tube guards	3	Area has no room number, arbitrarily assigned, room has local manual switch
38	1	148B	Open Storage	GTG	4' hooded industrial with 2 F32T8s & tube guards	2	1F32TBC in right or left lamp holders & tube guard	2	Area has no room number, arbitrarily assigned, room has local manual switch
39	1	148C	Storage Closet	J	4' wrap around with 3 F32T8s	1	2F32TBS in center lamp holders	1	Area has no room number, arbitrarily assigned, room has local manual switch
40	1	149A	Trash Area	GBTG	8' hooded industrial with 4 F32T8s & tube guards	1	2F32TBC in alternating sides & tube guards	1	Area has no room number, arbitrarily assigned, room has local manual switch
41	1	149B	Electric Meter Room	GBTG	8' hooded industrial with 4 F32T8s & tube guards	2	2F32TBC in alternating sides & tube guards	2	Area has no room number, arbitrarily assigned, room has local manual switch
42	1	149C	Gas Meter Room	W	explosion proof fixture with assumed 70W A19 incandescent	1	no retrofit	0	Area has no room number, arbitrarily assigned, room has local manual switch; Light fixture is a single incandescent bulb in an explosion proof fixture.
43	1	150	Elevator Room	HB	8' wrap around with 4 F32T8s	2	2F32TBC & centering kits	2	Area has no room number, arbitrarily assigned, room has local manual switch
44	1	151	Elevator Pit Access	R	4' strip fixture with 1 F32T8	1	1F32TBL	1	Area has no room number, arbitrarily assigned
45	1	1AI	Atrium- S Stairwell Entrance	T	exit sign with 2 FBT5 lamps	1	new universal mount green LED exit sign with battery backup	1	Area has no room number, arbitrarily assigned
46	1	1AI	Atrium- N Stairwell Entrance	U	exit sign with 2 FBT5 lamps	1	new universal mount green LED exit sign with battery backup	1	Area has no room number, arbitrarily assigned
47	1	1AI	Atrium- Elevator Entrance	VI	recessed can with 70W HPS (interior)	2	new 2x2 surface mount fixture with angled interior sides, clear prismatic lens & 2F17TBC	2	Area has no room number, arbitrarily assigned
48	1	1AI	Atrium Area	S	1x4 parabolic troffer with 1 F32T8	15	1F32TBL	15	Area has no room number, arbitrarily assigned
49	1	1AI	Atrium Area	B12	1x12 parabolic troffer with 3 F32T8s	12	3F32TBL	12	Area has no room number, arbitrarily assigned
50	1	1AI	Atrium Area	B8	1x8 parabolic troffer with 2 F32T8s	3	2F32TBL	3	Area has no room number, arbitrarily assigned, restrooms have occupancy sensor

- Builder must provide interior lighting/lamp schedule
- Include with maintenance info. provided to homeowner
- Intended to help homeowners replace with high efficacy compliant lamps
- May be provided in paper OR electronic format

Luminaire Efficacy

(§150.0(k)1A)

- **Classification of efficacy has changed**
  - Screw base can now be considered high efficacy
- **Luminaires are either:**
  - High efficacy by source types listed, or
  - Must be certified & labeled per JA8 to be classified as high efficacy
  - **No low efficacy allowed!**

TABLE 150.0-A CLASSIFICATION OF HIGH EFFICACY LIGHT SOURCES

High Efficacy Light Sources Luminaires installed with only the lighting technologies in this table shall be classified as high efficacy	
Light sources in this column other than those installed in ceiling recessed downlight luminaires are classified as high efficacy and are **not** required to comply with Reference Joint Appendix JA8	Light sources in this column shall be certified to the Commission as High Efficacy Light Sources in accordance with Reference Joint Appendix JA8 and be marked as meeting JA8.
1. Pin-based linear or compact fluorescent light sources using electronic ballasts. 2. Pulse-start metal halide. 3. High pressure sodium. 4. GU-24 sockets containing light sources other than LEDs. [a,b] 5. Luminaires with hardwired high frequency generator and induction lamp. 6. Inseparable SSL luminaires that are installed outdoors. 7. Inseparable SSL luminaires containing colored light sources that are installed to provide decorative lighting.	8. All light sources in ceiling recessed downlight luminaires. Note that ceiling recessed downlight luminaires shall not have screw bases regardless of lamp type as described in Section 150.0(k)1C. 9. GU-24 sockets containing LED light sources. 10. Any light source not otherwise listed in this table and certified to the Commission as complying with Joint Appendix 8.
Notes: a. GU-24 sockets containing light sources such as compact fluorescent lamps and induction lamps. b. California Title 20 Section 1605(k)3 does not allow incandescent sources to have a GU-24 base.	

Luminaire Efficacy

(§150.0(k)1A, cont'd)

Auto High Efficacy List (No JA8 Certification Required)	
2013 Standards	**2016 Standards**
Pin-based linear or Compact Fluorescent	No Change
GU-24 Sockets rated for CFLs/LEDs	Only GU-24 sockets rated for use with other than LED light sources (CFL/Induction)
Pulse Start Metal Halide & High Pressure Sodium	No Change
Induction	Luminaires with high frequency generator and induction lamp
LEDs Certified to the CEC as High Efficacy	Inseparable Solid State Lighting (SSL, aka LED) installed outdoors, or decorative

Luminaire Efficacy *cont.* (§150.0(k)1A)

JA8 Certification and Labeling required for:

- All lamps and separable light sources installed in ceiling recessed downlights
  - Tested for elevated temperature
  - Cannot have screw base socket, regardless of lamp installed
- Non-decorative indoor LEDs
  - Including GU-24 base luminaires containing LED
- Any lamp designed for use in screw base socket
- All light sources installed inside of enclosed luminaires
- All others

Luminaire Efficacy *cont.* (§150.0(k)1A)

JA8 Certification & Labeling Required for High Efficacy Classification	
Light Source Type	**More Info**
Recessed Downlights in Ceilings – All Lighting Sources	1. Tested for elevated temperature 2. Cannot have screw base socket, regardless of lamp
LEDs – Indoor, Non-decorative	Including GU-24 base luminaires containing LEDs
Any lamp designed for use in screw base socket	
All others not listed on this or previous table	

2016 JA8 Requirements

2016 Reference Appendices

JA8-2016 Requirements	
Category	**Requirements**
Color Rendering Index (CRI)	90 (Same as 2013)
Luminous Efficacy	45 Lumens per Watt across board (2013 had tiered requirements)
Power Factor	Min of 0.90 when tested at full output
Start Time	Must turn on within 0.5s
Correlated Color Temp (CCT)	Inseparable SSL (LED) light engines & GU24 LED Lamps, $\leq$ 4000 Kelvin Others: $\leq$ 3000 Kelvin

2016 JA8 Requirements

2016 Reference Appendices

JA8 Requirements (cont'd)	
Category	**Requirements**
R9	≥ 50
Rated Life	≥ 15,000 Hours
Minimum Dimming Levels	≤ 10%
Flicker	< 30% for frequencies of 200 Hz or below
Audible Noise	≤ 24 dBa at 1 meter from light source
Elevated Temperature (for enclosed luminaires)	Energy Star testing procedure to ensure life and quality of light lasts at higher temps

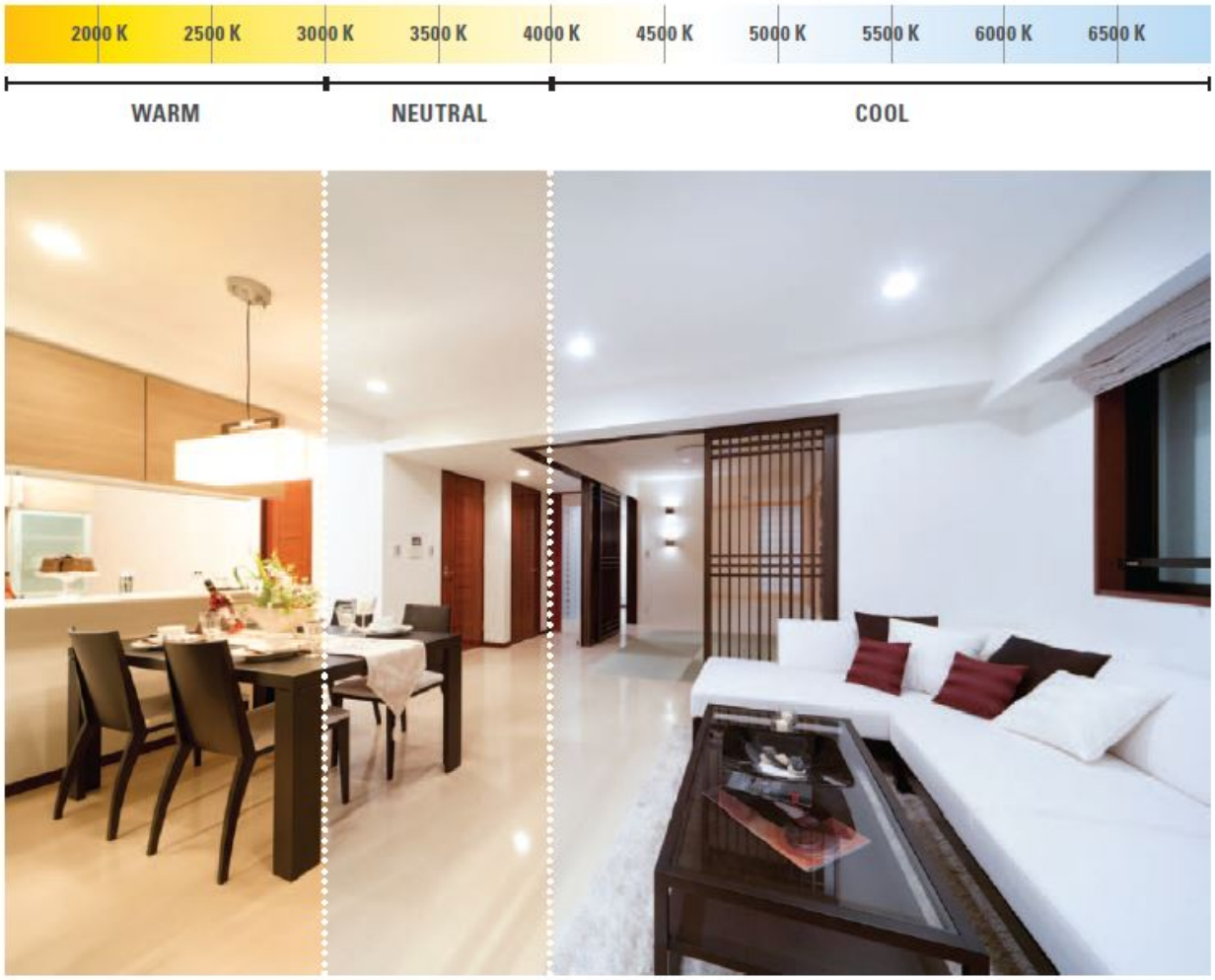
High Efficacy LEDs *(cont'd)*

JA8 – Color Rendering Index (CRI)

Source: California Lighting Technology Center

High Efficacy LEDs *(cont'd)*

JA8 – Correlated Color Temperature (CCT)

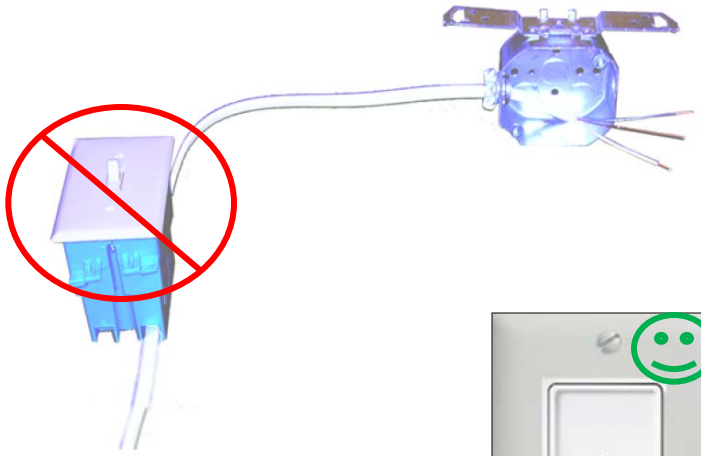


Source: California Lighting Technology Center

Blank Electrical Boxes

(§150.0(k)1B)

- **2013 Standards**
  - No limitation on how many can be installed



- **2016 Standards**
  - Limited to total number of bedrooms (which are more than 5 ft above floor)
  - Must be served by dimmer, vacancy sensor, or fan speed control

Recessed Downlights

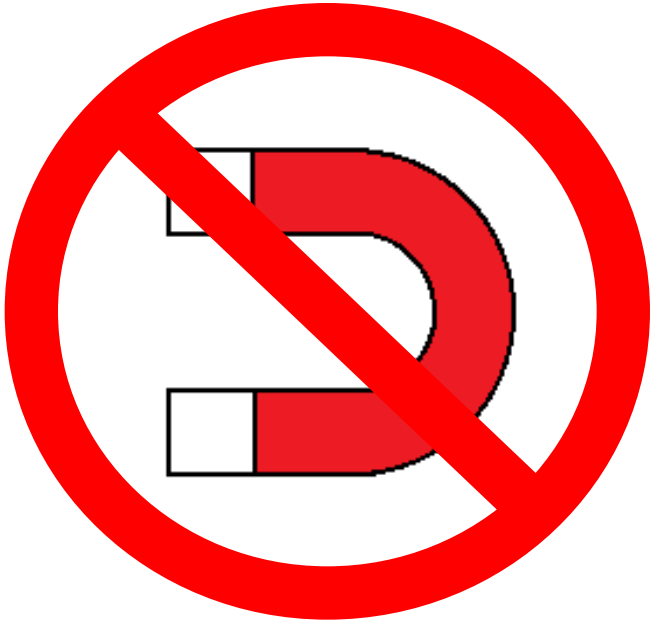
(§150.0(k)1C)

Recessed Downlight Requirements	
2013 Standards	**2016 Standards**
IC/AT	No Change
Gasket & Sealed	No Change
Allow ballast maintenance from below ceiling	No Change
Allowed Screw Base Sockets (as low efficacy)	**No** Screw Base Sockets Allowed!
Any light source allowed	**Only** JA8-2016-E certified & marked light sources (“E” for elevated temperature)

Electronic Ballasts

(§150.0(k)1D)

- Ballasts for fluorescent lamps rated 13 watts or greater shall be:
  - Electronic (not magnetic), and
  - Shall have output frequency no less than 20kHz



Night Lights & Exhaust Fans

(§150.0(k)1E & F)

- Permanently installed night lights or those integral to exhaust fans shall consume no more than 5 watts
- Lighting integral to exhaust fans must meet all applicable lighting requirements
  - Except lighting installed by the manufacturer in kitchen exhaust hoods

Screw Base Luminaires

(§150.0(k)1G)

- Shall not be recessed downlight luminaires in ceilings
- Shall contain lamps that comply with JA8
- Lamps shall be marked with “JA8-2016” or “JA8-2016-E”
- Exception: Luminaires with hard-wired ballasts for high intensity discharge lamps (HID)

Enclosed Luminaires

(§150.0(k)1H)

- Enclosed luminaires must contain light sources marked "JA8-2016-E"
- Indoor and outdoor
- Defined as having ventilation openings < 3 in^2 per lamp

Questions?

Can screw base lamps be high efficacy?

Are all LED Luminaires considered high efficacy?

Can recessed downlight luminaires have screw base sockets?

How much longer are we going to do this...?

Section 3

Let’s talk about indoor lighting and controls…

Lighting Controls
(§100.1, definitions)

Lighting Control Type	What does it do?
Dimmer	• Varies luminous flux of electric lighting system by changing power delivered to system • Or, just dims
Occupant Sensor (Indoor or Outdoor)	• Auto-off after 30 minutes • Auto-on based on occupancy (motion)
Vacancy Sensor	• Auto off after 30 minutes • Manual-on (not auto-on)
Photo Control (Outdoor)	• Auto-on/off based on available daylight
Astronomical Time-Switch Control (Outdoor)	• Controls light based on time of day • Based on *astronomical events* like sunset, sunrise • Accounts for geographic location & calendar date.

Interior Lighting Controls
(§150.0(k)2)

Control Types	Requirements
LED Dimmers	All forward phase cut dimmers must comply with NEMA SSL 7A
Exhaust Fans & Lighting	Exhaust fans shall be switched separately from lighting systems
Readily Accessible Controls	All lights must have readily accessible manual on/off control
No Vacancy Bypass	No control shall bypass vacancy sensor
Under-cabinet Lighting	Must be switched separately from other lighting

Interior Lighting Controls *cont.*

(§150.0(k)2)

Indoor Lighting Option Changes	
2013 Standards	**2016 Standards**
Kitchens: At least 50% High Efficacy (HE)	All must be HE
Cabinet Lighting: 20 W/linear foot	All must be HE
Bathrooms: at least 1 high efficacy, low efficacy (LE) allowed + Vacancy	All must be HE + at least 1 controlled by Vacancy Sensor
Garage/Laundry/Utility: HE + Vacancy	All must be HE + at least 1 controlled by Vacancy
All Others: HE or LE + Controls	All must be HE

Garages For 8 or More Vehicles (§150.0(k)5)

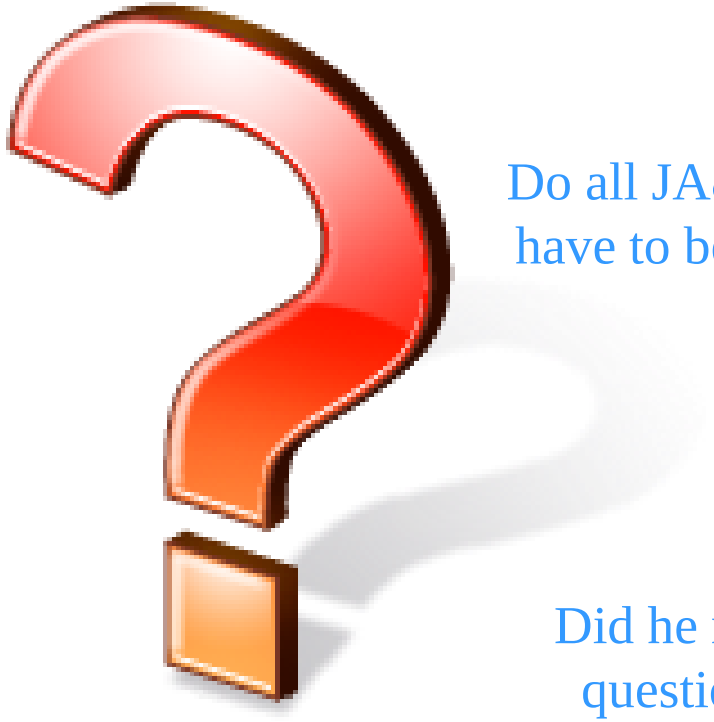
- Garages for 8 or more vehicles shall meet the nonresidential lighting requirements
  - Sections 110.9, 130.0, 130.1, 130.4, 140.6, 141.0
    - Control requirements and wattage limitations

Interior Common Areas
(§150.0(k)6)

When Common Areas Make Up ≤ 20% of Total Building Floor Area	When Common Areas Make Up > 20% of Total Building Floor Area
Luminaires shall be high efficacy **and** controlled by occupancy sensor (auto-on is acceptable)	Luminaires shall comply with nonresidential requirements **and** Lighting in corridors and stairwells must be controlled by occupancy sensor that reduces power by at least 50% (auto-on is acceptable)

Lighting Control Questions?

50% of lights in kitchens must be high efficacy?



Do all JA8 Light Sources have to be on a dimmer?

What is a vacancy sensor?

Did he really write in questions for us...?

Section 4

Let's knock out Outdoor Lighting…

Single-Family Outdoor Lighting

(§150.0(k)3A)

Outdoor Lighting Changes	
2013 Standards	**2016 Standards**
Low Efficacy (LE) allowed w/ controls	All must be HE
	Must have manual control (typically toggle)
	Must be controlled by either: 1. Photocell w/ Motion sensor (6 hour override allowed); Or 2. Astronomical time clock (6 hour override allowed); Or 3. EMCS which does what astronomical time clocks do w/o override

Single Family Outdoor Lighting

(§150.0(k)3A, cont'd)

- Single family outdoor lighting:
  - Important to note that lighting must be attached to building in order to be regulated

  In other words…

  - Pole lighting not regulated, unless addressed in 150.0(k)3B, C, or D

Multifamily Outdoor Lighting
(§150.0(k)3B)

- Multifamily private patios, entrances, balconies, porches, and parking lots/carports with less than 8 cars:
  - Lighting shall comply with single-family lighting requirements (150.0(k)3A); **or**
  - Lighting shall comply with nonresidential outdoor lighting requirements (controls and wattage limitations)

Residential Parking Lots

(§150.0(k)3D)

- Lighting for parking lots or carports with 8 or more spots shall meet nonresidential lighting requirements
  - Control requirements and wattage limitations

Source: California Lighting Technology Center

Multi-Family Outdoor Lighting
(§150.0(k)3C)

- Residential buildings with 4 or more dwellings:
  - Lighting not regulated by 150.0(k)3A, B, or D shall meet the nonresidential lighting requirements (control requirements and wattage limitations)
    - Includes outdoor lighting not attached to a building on the residential site

Address Signs
(§150.0(k)4)

- Internally illuminated address signs shall:
  - Comply with the nonresidential sign requirements of §140.8

    or
  - Consume no more than 5 watts

Outdoor Lighting in a Nutshell

(Figure 6-10 of 2013 Residential Compliance Manual)

Residential [2] Versus Nonresidential [3] Lighting Requirements				
Space type	Single-Family	Low-rise multifamily		High-rise Multifamily and Hotels
		1-3 Dwelling units	4 or more Dwelling units	
Private patios, entrances, balconies, porches; parking lots carports with fewer than eight vehicles per site	Residential	Residential or Nonresidential		Residential, if the lighting is separately controlled from the inside of a dwelling unit or guest room. Otherwise, nonresidential
Residential parking garages[1], lots and carports with more than eight vehicles per site	Nonresidential			
Other outdoor lighting attached to the building	Residential		Nonresidential	
Outdoor lighting not attached to a building	Not regulated		Nonresidential	

1. Residential parking garages with seven or fewer vehicles are covered by the indoor residential lighting requirements.
2. "Residential" means that the lighting shall comply with §150.0(k)9A
3. "Nonresidential" means that the lighting shall comply with §110.9, §130.0, §130.2, §130.4, §140.7, and §141.0 as applicable.

Figure 6-10 – Applicability of Standards to Outdoor Lighting in Different Residential Building Types

Outdoor Lighting Questions?

Do high efficacy luminaires need a photocell?

Is pole lighting regulated for single family buildings?

Do you really regulate address signs?

We have to be done, right...?

Section 5

Let's wrap up 2016 with Additions and Alterations…

Additions & Alterations

(§150.2(a) and (b))

- All **newly installed** lights must meet applicable requirements
- Same high efficacy requirements
- Control requirements applicable when controls are altered or added

Summary, please!

Summary of Lighting Changes

- **<u>All</u> residential lighting must be high efficacy**
  - Qualifies automatically; or
  - Is JA8-2016 certified and labeled
- **JA8-2016-E certification required for:**
  - Lamps and separable light sources in recessed downlights (cannot be screw base socket)
  - Enclosed luminaires
- **All JA8 certified light sources must be controlled by a dimmer or vacancy sensor**
- **Should see:**
  - JA8-2016 light sources with controls; or
  - Non-enclosed or non-recessed luminaires with high efficacy lighting

Section 6

And finally, resources!

Approved Compliance Software

Used to show compliance with the Energy Standards when using the Performance Approach

- **Residential**
  - CBECC-Res
  - Energy Pro
  - Wrightsoft Right-Energy
- **Nonresidential**
  - CBECC-Com
  - Energy Pro
  - IES Virtual Environment

www.energy.ca.gov/title24/2016standards/2016_computer_prog_list.html

Approved HERS Providers

- New construction and HVAC alterations *(Residential and Nonresidential)*
  - CalCERTS
    - New construction, HVAC alterations, and whole house ratings
  - CHEERS
    - New construction and HVAC alterations

www.energy.ca.gov/HERS/providers_2016standards.html

Blueprint

- Email Newsletter
- Published quarterly
- Clarifications on frequently asked questions

Issue 113 | March – April 2016

BLUEPRINT

California Energy Commission
Efficiency Division

In This Issue

New Mechanical Acceptance Test Technician Certification Provider

On January 13, 2016, the California Energy Commission (Energy Commission) approved the National Environmental Balancing Bureau (NEBB), as a mechanical Acceptance Test Technician Certification Provider (ATTCP).

This gives NEBB the authority to train, certify, and oversee acceptance test technicians (ATTs) and their employers. NEBB will train and certify ATTs to perform all 17 mechanical acceptance tests required in the *2013 Building Energy Efficiency Standards* (Energy Standards).

The Conditions of Approval are available for review in the **Executive Director's recommendation**.

For more information, please visit: **http://energy.ca.gov/title24/attcp/**.

Small Duct High Velocity Space Conditioning Systems

Small duct high velocity (SDHV) systems may be used to comply with the Energy Standards. The following is a list of requirements with direction on how SDHV systems can comply with the low-rise residential requirements of the Energy Standards.

Mandatory Requirements

United States Department of Energy Standards:

SDHV systems manufactured on or after January 23, 2006, and before January 1, 2015, must have a minimum Seasonal Energy Efficiency Ratio (SEER) of 11, and a minimum Heating Seasonal Performance Factor (HSPF) of 6.8.

SDHV systems manufactured on or after January 1, 2015, must have a minimum SEER of 12, and a minimum HSPF of 7.2.

Energy Standards:

Section 150.0(m)13B - Single zone systems that use forced air ducts to supply cooled air to an occupiable space must either meet minimum airflow and fan efficacy requirements, or meet the return duct and grille sizing requirements of **TABLES 150.0-C or 150.0-D**.

NOTE: The return duct and grille sizing alternative will likely be the method chosen for compliance when installing a SDHV system.

Section 150.0(m)15 - Specific to systems with multiple thermostatically controlled zones, this section requires the same mandatory airflow and fan efficacy requirements as **Section 150.0(m)13B**. However, it does not have the same duct and grille sizing alternative. If such systems cannot satisfy the airflow and fan efficacy requirements of this section, compliance must be demonstrated via the performance approach.

The duct leakage and insulation requirements apply as with any other system.

Prescriptive Requirements

The refrigerant charge and duct insulation requirements apply as with any other system.

www.energy.ca.gov/efficiency/blueprint/

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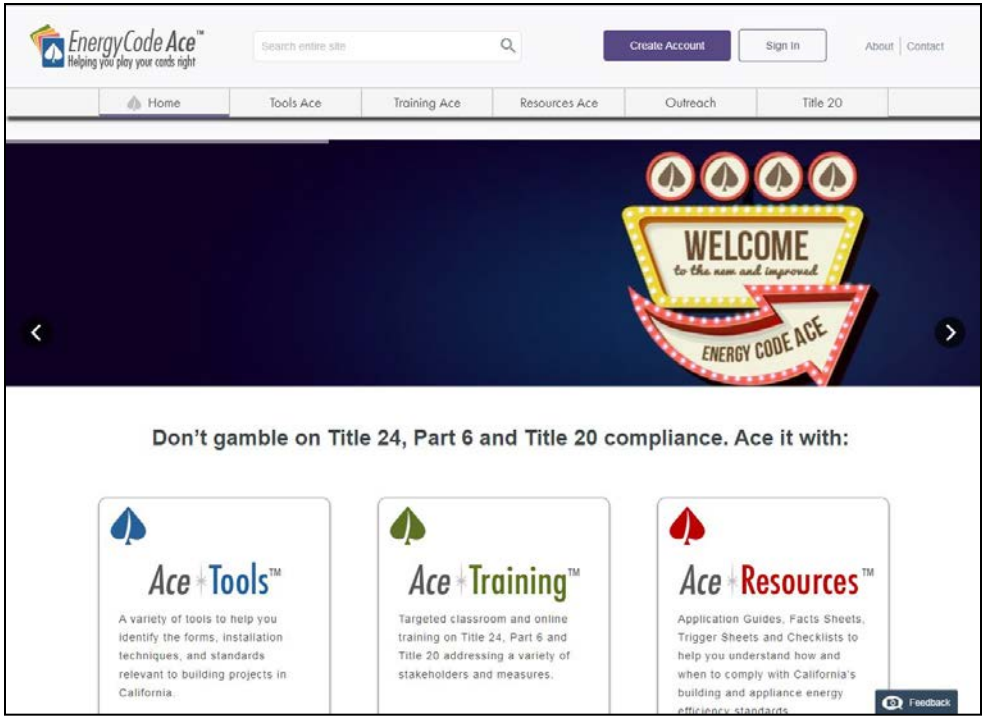

- Forms and Resources
- Free training in person and online
- Checklists, Trigger Sheets, and Fact Sheets

www.energycodeace.com/content/home/

Energy Standards Hotline

- Open Monday through Friday
  - 8:00 a.m. to 12:00 p.m. and 1:00 p.m. to 4:30 p.m.
- Call
  - 800-772-3300 (in CA)
  - 916-654-5106 (outside CA)
- Email
  - Title24@energy.ca.gov